

Application No.: 10/727,900Docket No.: 123034-05004744

REMARKS

By this amendment, claims 7, 9, and 12-13 have been amended, claim 8 has been cancelled, and claims 15-17 have been newly added. Accordingly, claims 7, 9-13, and 15-17 are pending in this application. Reconsideration and allowance of the present application based on foregoing amendment and the following remarks are respectfully requested.

Claim rejection under 35 U.S.C. § 112

Claims 7, 8, and 13 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention, particularly because of no antecedent basis in the terms of "the organic material, the oxide film or the metal" in claim 7 and "the insulating film" in claim 13. Claims 7 and 13 have been amended to cure such informalities and therefore withdrawal of this rejection is respectfully requested. Rejection of claim 8 under 35 U.S.C. § 112 is now moot due to cancellation of this claim.

Claim Rejections - 35 U.S.C. § 103

Claims 7-8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fonash et al. (US 2003/004017 A1) in view of Lavallee et al. (US 2003/180627 A1). Applicants respectfully traverse this rejection of claims 7-8 for the following reasons.

Claim 7 has been amended via the inclusion of the subject matter of claim 8 and recites "e) forming an upper electrode ... so that an upper electrode is formed on the sacrificial layer surrounding the lower electrode and on an exposed portion of the insulating layer; ... wherein ... the nanogap is formed so that vertical and horizontal distances thereof are asymmetric so that the horizontal distance is larger than the vertical distance." Nowhere do Fonash et al. or Lavallee et al. disclose, teach or suggest these claimed features.

In Applicants' invention as claimed in claim 7, the upper electrode is formed not only on

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the sacrificial layer which surrounds the lower electrode, but also on an exposed portion of the insulator (Applicants' disclosure, page 7, line 17 to page 8, line 2; and Fig. 1D). In order for the current to flow only in a vertical direction from the upper electrode to the lower electrode and not to flow into a lateral direction of the lower electrode, the sacrificial layer pattern is formed to have a thickness on the lower electrode thinner than a lateral distance between the lower and upper electrodes, thereby forming a nanogap also having asymmetric vertical and horizontal distances so that the horizontal distance is larger than the vertical distance (Applicants' disclosure, page 8, lines 7-16; and Figs. 1E-1F).

In contrast, Fonash et al., the primary reference cited by the Examiner, appear to form a top electrode (18 or 33) parallel to a bottom electrode (14 or 30) and the top electrode is not formed on both the sacrificial layer and an exposed portion of an underlying insulating layer, providing only a vertical distance between the top and bottom electrodes (Fonash et al., FIGS. 1h and 3c). Therefore, the nanogap in Fonash et al. has *neither* a horizontal distance between the top and bottom electrodes *nor* asymmetric horizontal and vertical distances. It is submitted therefore that Fonash et al fail to disclose, teach or suggest the claimed features of forming an upper electrode on the sacrificial layer and on an exposed portion of the insulating layer; and forming a nanogap having an asymmetric vertical and horizontal distances.

Lavallee et al. appear only to disclose a method of producing a structure of etch-resistant polymer with a sterol layer and e-beam lithography, but do not disclose an electrode and a sacrificial layer, let alone asymmetric horizontal and vertical distances. Therefore, Lavallee et al. fail to disclose, teach or suggest the above claimed features either.

Therefore, Applicants respectfully submit that combination of Fonash et al. in view of Lavallee et al. fails to disclose all the limitations claimed in claim 7 and respectfully request withdrawal of the rejection of claim 7 under 35 U.S.C. § 103(a). Rejection of claim 8 under 35 U.S.C. §103(a) is now moot due to cancellation of this claim.

Claims 9-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fonash et al. in view of Lavallee et al. and further in view of Tao et al. (US Patent No. 5,497,000).

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Applicants respectfully traverse the rejection of claims 9-11 for the following reasons.

Independent claim 9, as amended, includes similar limitations discussed with regard to claim 7, accordingly, is likewise allowable over Fonash et al. in view of Lavallee et al. Tao et al. appear only to disclose a method of electrochemical detection of single organic molecules using scanning tunneling microscopy, but do not disclose an electrode and a sacrificial layer.

Therefore, it is submitted that claim 9 is patentable over combination of Fonash et al. in view of Lavallee et al. and Tao et al. Claims 10-11 depend from claim 9 and are believed allowable for at least the reasons presented above with respect to claim 9 by virtue of their dependence from claim 9, as well as on their own merits.

Claims 12-13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fonash et al. in view of Lavallee et al. and further in view Milanovski et al. (US Patent No. 6,770,190). Applicants respectfully traverse the rejection of claims 12-13 for the following reasons.

Independent claim 12, as amended, includes similar limitations discussed with regard to claim 7, accordingly, is likewise allowable over Fonash et al. in view of Lavallee et al. Milanovski et al. appear only to disclose an electrochemical detection of analyte in a sample by monitoring electric potential difference between a sensing electrode treated in a sending solution and a reference electrode, but do not disclose an electrode and a sacrificial layer.

Therefore, it is submitted that claim 12 is patentable over combination of Fonash et al. in view of Lavallee et al. and Milanovski et al. Claim 13 depends from claim 12 and is believed allowable for at least the reasons presented above with respect to claim 12 by virtue of its dependence from claim 12, as well as on its own merit.

New Claims

Claims 15-17 have been added to provide Applicants with the scope of protection to which they are believed entitled. The new claims find solid support in the original specification, e.g., at page 7, lines 5-7.

Newly added claims 15-17 depend from claims 7, 9, and 12 respectively and further

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recite that the sacrificial layer is formed of Ti, Pt or Au. The references of Fonash et al., Lavalley et al., Tao et al., Chiba et al. or Milanovski et al. fail to disclose, teach or suggest the that the sacrificial layer formed of Ti, Pt or Au and therefore, it is submitted that claims 15-17 are allowable over those cited references, taken individually or in combination.

Conclusion

All objections and rejections having been addressed, it is respectfully submitted that the present application is in condition for allowance and a notice to that effect is earnestly solicited. Should any questions remain unresolved, the Examiner is encouraged to contact the undersigned attorney for Applicants at the telephone number indicated below in order to expeditiously resolve any remaining issues.

Respectfully submitted,
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